An EOS Aura science team meeting was hosted by the MLS and TES teams April 4-5, 2001 at the Pasadena Convention Center, Pasadena CA.

Mark Schoeberl (project scientist) opened the meeting. Phil deCola (program scientist at NASA HQ), spoke briefly about uncertainties at headquarters due to the new administration. Mark Schoeberl, representing Aura Project Manager Peg Luce, presented the overall status of the project. Most of the 6 month launch delay to June 2003 has been consumed by delays in the instrument delivery dates, and there is very little slack in the schedule. Tom Nosak, spacecraft manager for TRW, reported on challenges to integration of the Aura platform presented by the delay in the Aqua launch. He assured us that integration of the Aura spacecraft will be completed before the Aura instruments are delivered.

Mark Schoeberl described formation flying of the Aqua, Cloud-Sat, Picasso, Parasol and Aura satellites. He used an animation to illustrate how the satellites follow each other in similar orbits. Aqua is followed within a few minutes by Cloud-Sat, Picasso and Parasol; the separation between Aura and Aqua is only 15 minutes. Formation flying will make it possible to combine aerosol information from all satellites with the water vapor measurements made by MLS, thus enhancing the scientific value of individual data sets. Rich McIntosh presented some of the technical challenges of formation flying. Bob Jones responded to questions about the impact of frequent use of thrusters to maintain the orbit formation.

The Aura instrument principal investigators presented information about the present status of their instruments, the algorithm, and data processing preparations. John Gille and John Barnett (Co-PIs, HIRDLS) report that most subsystems have been delivered. Joe Waters (PI, MLS) showed a pamphlet describing technical aspects and science goals which has been developed by MLS. The MLS instrument schedule has little slack but the team is committed to on-time delivery. Reinhard Beer reported that integration of TES is nearly complete, although there have been some delays due to a problem with detectors. Exercises of the TES nadir algorithm with input data from sonde measurements and from a model simulation are promising. Bert van den Oord (deputy PI OMI) reported on the progress of the instrument, and preparation for the ATDB review that will take place at the end of the summer.

There are seven working groups associated with Aura. The Science group (chair, A. Douglass) organizes the annual science team meeting. The Mission Operations group (chair, A. Kelly) did not make a report at this meeting, since an Aura Ground System review will be held at GSFC in late April. The Education and Public Outreach group met in January and E. Hilsenrath (chair) presented their progress at this meeting. Outreach activities are planned in collaboration with three partners: the American Chemical Society through their publication Chem Matters that is aimed at high school teachers and their students; the GLOBE project, that involves students in measurement programs; and the Smithsonian, which is developing an exhibit for the Smithsonian and for other museums. The other four groups met on Tuesday April 3. The Algorithm working group (chair, N. Livesey) reported on progress in an intercomparison exercise involving all of

the instruments using a single orbit through a constituent field simulated by the MOZART model. The Data Systems group (S. Lewicki, acting chair) reported on approval of the Aura level 2 guidelines, and the need to develop guidelines for the mapped data to be produced in level 3. The aerosol group (S. Massie, chair) reported on the need for a computer code that can be adapted to general use for the Aura instruments to evaluate the impact of aerosols and clouds on the constituent retrievals. The validation working group (L. Froidevaux and A. Douglass, co-chairs) reported on the status of the Aura Science and Validation document. The working document will be upgraded to Version 1.0 and made available outside the validation team pending consensus on the validation priorities and the executive summary. All additional inputs to the document are due May 1.

Science presentations completed the meeting agenda. Several presentations concerned topics related to instrument and algorithm development. The TES retrieval team gave presentations on preliminary results with the single orbit test (H. Worden), the capability of TES retrievals to capture ozone temporal variability (K. Bowman), and ways to account for aerosols and clouds in TES measurements (A. Eldering). B. van den Oord presented results with the OMI development model. A statistical method of calculating radiative transfer for HIRDLS was shown to be superior to other methods in accuracy and speed of computation (T. Heinemann). A presentation on OH column measurements over JPL's Table Mountain Facility (F. Mills) was followed by a discussion of non-LTE effects on OH mesospheric measurements (H. Pickett).

Various approaches to validation of satellite observations were presented. P. Novelli showed observations made at NOAA/CMDL for validation of MOPITT observations of CO and CH4. R. Rood demonstrated the potential of ozone assimilation to monitor instrument performance and stability. R. Salawitch gave an overview of the SOLVE mission and the dual purposes of validation and addressing science goals through a combination of aircraft and satellite observations.

Much discussion was prompted by presentations concerning the role of cirrus clouds in the tropics. J. Holton showed subvisible cirrus above convective anvils with tops above about 14km, produce cooling that can offset the heating due to subsidence, and discussed the implications of such processes on stratospheric water. However, UARS HALOE observations show that subvisible cirrus clouds often occur in the tropics away from regions of deep convection (S. Massie). These two papers are relevant to the objectives of The Tropical Composition and Climate Coupling Experiment, a mission proposed to provide validation for the Aura platform while addressing scientific questions as those posed by Holton and Massie.

A three dimensional chemistry and transport model (CTM), driven by winds from the Goddard Earth Observing System Data Assimilation System, is being used to interpret tropospheric measurements from the GOME instrument. R. Martin showed comparisons of a simulation from the Harvard chemistry and transport model (CTM) with calculations of tropospheric column NO2 from GOME measurements of the total column. P. Palmer

also used the Harvard CTM and GOME observations of formaldehyde to evaluate the emissions of isoprene used in the model.

Several presentations concerned current issues in atmospheric chemistry. M. Schoeberl showed estimates of ozone loss during the SOLVE period using data from ozonesondes, the lidars aboard the DC-8, in situ ozone measurements from the ER-2, and satellite ozone measurements from Polar Ozone and Aerosol Measurement III (POAM). A. Tabazadeh discussed issues of detection of denitrification in UARS MLS observations of HNO3 that will be useful in analysis of Aura MLS HNO3; such issues are also relevant to present and future northern hemisphere ozone loss. H. Pumphrey showed the importance of mesospheric measurements that are possible with EOS MLS. UARS MLS observations of CH3CN show an enhancement in August 1992 that may be related to midlatitude injection of tropospheric air from a forest fire into the stratosphere (N. Livesey).

A number of presentations concerned atmospheric dynamics. Topics included the following: the Whole Air Community Climate Model, an atmospheric general circulation model with interactive chemistry for the lower and middle atmosphere (B. Boville); improvements in the data assimilation product of the NASA GSFC Data Assimilation Office DAO) by utilization of a general circulation model being developed jointly by NCAR and DAO, and validation of the stratospheric dynamics and constituent transport using that system (S. Pawson); analysis of stratospheric warmings during the 2000-2001 northern winter (G. Manney); theoretical analysis of the gravity waves likely to contribute to the quasi-biennial oscillation, and how such waves are likely to be seen in HIRDLS data (J. Alexander).

The next Aura science team meeting will be held in Spring, 2002, probably in the Netherlands.